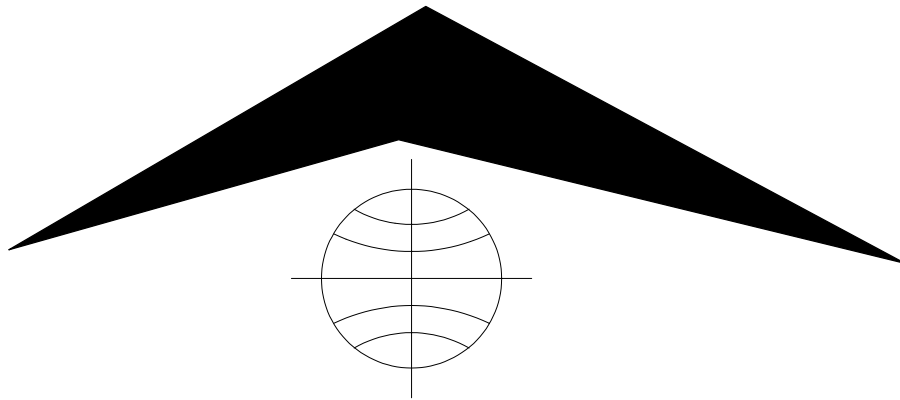


FLP-2492/KLP-4492 Impeller Flowmeter



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General Information

Overview

The FLP-2492/KLP-4492 impeller flowmeter utilizes a unique fiber-optic sensing mechanism that is designed to minimize the drag associated with other mechanical flowmeters, which use magnets or proximity relays to sense impeller rotation.

Please refer to figure 1 for a general description of the probe. The FLP-2492 is equipped with a standard Mount Sopris single conductor probe top. The KLP-4492 is equipped with a 4-conductor probe top of a customer specified type.

Connectors and Layout

Normal cable assignments are as follows:

Cable line 1	Power and Signal Common (Cable armor on single conductor system)
Cable line 2	Positive (+) Power, Signal (Center conductor on single conductor systems)
Cable line 3	Not used
Cable line 4	Not used

Theory of Operation

The probe requires +30 VDC at the probe top. Pulses from a driver circuit representing impeller rotation (4 pulses per revolution) are sent up the cable. Direction of rotation is not available with this data, so the operator must determine flow direction by logging at different speeds in the same direction and noting whether the impeller rate increases or decreases with respect to changes in rate. See notes in appendix for more information.

The impeller is fitted on rotor which has 2 fiber optic cables imbedded in it which are looped in 180 degree planes in the mounting body. The impeller is held onto the shaft by a nut. The end bearing on the shaft allows the whole assembly (rotor and impeller) to rotate freely on the shaft. Note that the shaft is locked into the probe sensor assembly by a 6/32 set screw (using a 1/16" allen wrench) that is tightened onto the recess on the other end of the shaft.

The sensor assembly has two small openings (lenses) that are aligned 180 degrees apart. They are radially set the same distance from the center axis of the probe as are the ends of the fiber optic loop on the rotor.

When the rotor spins, the light from one of the lenses (led) passes through the loop of fiber optic cable and is received at the other side (photodiode). This occurs 4 times per revolution.

Specifications

Diameter	4.2 cm (depends on cage/impeller configuration)
Weight	9 kg
Length	122 cm
Measuring range	2-70 meters/minute
Resolution	< 0.3 m/min
Pressure	2000 psi
Temperature	70 degrees C

Installation

Installing cages and impellers

Cages must be removed first before removing or changing impellers. They are then re-installed. Cages are simply unscrewed from the weight section. Cages should only be hand tightened. Apply a few wraps of electrical tape to maintain a clean tight connection. Do not allow the housing at the top of the weight section to rotate with respect to the weight, as this may twist off the internal wires.

To change the impeller, unscrew the knurled nut on the end of the impeller and pull it from the shaft. Install the new impeller and replace the nut. Be careful not to apply lateral force on the shaft as this may cause the bearing and rotor to bind.

Operating Procedure

Operation

All impeller flowmeters operate in the same fashion. Generally, up and down passes are logged at different speeds and a calibration curve is constructed to account for different well fluid characteristics and friction effects. See the application notes in the appendix (courtesy of Western Atlas) for more details.

MSLog

1. Select the correct tool driver from the Tool panel selection box. If the correct one is not available run MSLConfig to install it.
2. In the Tool panel, click the Power On button.
3. Click the Depth panel upper right corner icon. Click Zero Tool.
4. If you wish to fill out the header, in the Acquisition panel click Header button.
5. In the Acquisition panel, click Record and select a file name.
6. Turn on the desired, Depth Sampling mode.
7. If you are printing, turn on the printer in MCHCurve.
8. Log to the desired interval as normal. Refer to the MSLog manual for additional information on logging.
9. When done, in the Acquisition panel, click Stop.
10. In the Tool panel, click the Power Off button before removing the probe.

Performance Checks and Calibrations

See Appendix (Applications Notes) for details

Preventative Maintenance

The probe should be thoroughly cleaned after each use, using fresh water, and allowed to dry before storage. The fiber optic-cable ends and diode lenses must be kept clean and clear to operate correctly. The probe should send out 4 pulses per revolution of the impeller, which can be checked on the surface with the logging equipment.

If the rotor or sensor is suspected to be dirty, remove the cage. Then remove the rotor section from the sensor by loosening the 6/32 set screw with a 1/16" Allen wrench. Visually inspect the four windows on the rotor and the two windows on the sensor. Wipe with moist soft cloth. When logging in casing with much rust and scale, it is very likely that the sensor and rotor windows will become coated with iron oxide and will require cleaning. Routine cleaning will keep the probe in optimum condition and provide good data. Cleaning is recommended after every logging operation.

Troubleshooting

Disassembly Instructions

Only qualified personnel should disassemble this probe. Remove the 4 radial screws between the probe top and the electronics housing, and gently pull the probe top off of the housing. Caution should be used in this process as an o-ring is installed on the probe top and will resist this motion until freed. A twist off electrical connector will be exposed, which can be unscrewed, allowing the probe top to be removed. The electronics housing can then be unscrewed to expose the electronics of the pulse driver circuit. There are no user serviceable parts in the sensor, and it cannot be disassembled.

Schematics

FLP-2492/KLP-4492

Drawing Number	Title
Figure 1	Impeller Flowmeter

Appendix

See Applications Notes (Dresser Atlas)